

Innovations for the Affordable Conductive Thermal Control Material Systems for Space Applications, Phase II

Completed Technology Project (2016 - 2018)



Project Introduction

This proposal is submitted to develop and validate the innovative concept for the affordable conductive thermal control material systems that are proven feasible during phase I efforts. The reproducibility and optimization of the material processing, the space environment stability, of the affordable multifunctional thermal control material system (TCMS) that can be applied to space hardware and can enable the hardware to carry higher leakage current are planned to receive attention in phase II study. The suggested efforts emphasize developments in two material science areas: the first one considers the development of intercalated boron nitride nano structure that includes nanotubes and nano mesh and the second area proposes the synthesis and processing of various compounds with proton and electron conductivity along with its plasma sprayable versions. The matured material system that integrates these technology aspects can allow higher leakage currents at affordable costs. Thus the envisioned affordable material systems validation efforts can provide the needed reliable TCMS in typical space environments in (LEO), (GEO) & beyond. The reliability goal for the affordable conductive TCMS are: a design life of > 10 years in LEO and > 15 years in GEO, and we anticipate the developments to mature by end of phase II ready for the hardware demonstration.

Primary U.S. Work Locations and Key Partners

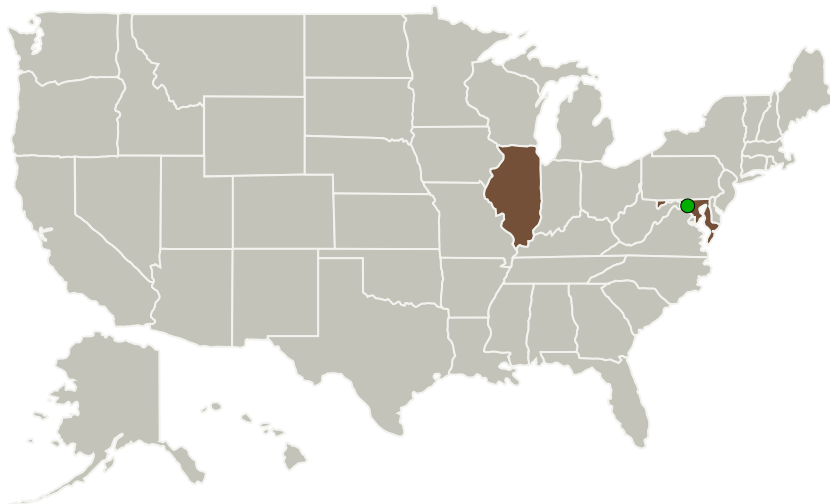


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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Applied Material Systems Engineering, Inc. (AMSENG)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Continued on following page.

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Organizations Performing Work	Role	Type	Location
Applied Material Systems Engineering, Inc. (AMSENG)	Lead Organization	Industry Small Disadvantaged Business (SDB)	Schaumburg, Illinois
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

Illinois	Maryland
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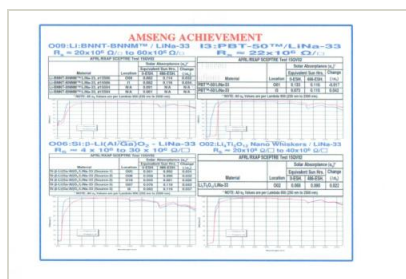
Project Transitions

**May 2016:** Project Start**November 2018:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139606>)

Images



Briefing Chart Image

Innovations for the Affordable Conductive Thermal Control Material Systems for Space Applications, Phase II

(<https://techport.nasa.gov/image/130586>)

Final Summary Chart Image

Innovations for the Affordable Conductive Thermal Control Material Systems for Space Applications, Phase II
(<https://techport.nasa.gov/image/137131>)

Project Management (cont.)

Program Manager:

Carlos Torrez

Principal Investigator:

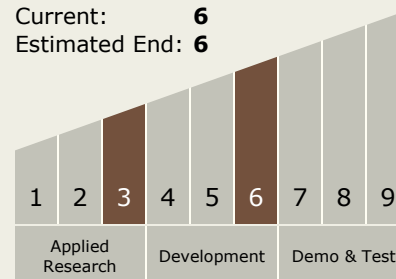
Mukund S Deshpande

Co-Investigator:

Mukund Deshpande

Technology Maturity (TRL)

Start: 3
Current: 6
Estimated End: 6



Technology Areas

Primary:

- TX14 Thermal Management Systems
 - TX14.2 Thermal Control Components and Systems
 - TX14.2.2 Heat Transport

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Target Destinations

The Sun, Earth, The Moon,
Mars, Others Inside the Solar
System, Outside the Solar
System